



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/212,726	12/15/1998	KLAUS F. SCHUEGRAF	M122-1098	7984
21567	7590	06/14/2005	EXAMINER	
WELLS ST. JOHN P.S.			KIELIN, ERIK J	
601 W. FIRST AVENUE, SUITE 1300			ART UNIT	
SPOKANE, WA 99201			PAPER NUMBER	

2813

DATE MAILED: 06/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.		Applicant(s)	
	09/212,726		SCHUEGRAF, KLAUS F.	
	Examiner		Art Unit	
	Erik Kielin		2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 60-62, 64 and 66 is/are pending in the application.
- 4a) Of the above claim(s) none is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 60-62, 64 and 66 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This action responds to the Amendment filed 31 March 2005.

#### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims **60-62**, **64** and **66** are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,356,722 (**Nguyen et al.**) in view of US 5,593,741 (**Ikeda**) and considered with **Wolf, et al. Silicon Processing for the VLSI Era, Vol. 1-Process Technology**, Lattice Press: Sunset Beach CA, 1986, pp. 166-167, for a showing of inherency only.

Regarding claim **60**, **Nguyen** discloses a semiconductor processing method of depositing a SiO<sub>2</sub> layer comprising,

providing a substrate **12** within a cold-wall, chemical vapor deposition (CVD) reactor **10** (Fig. 2);

providing rf power of 300 to 1000 watts, which overlaps 650 watts and a temperature of 350 to 450 °C within the CVD chamber, which overlaps 400 °C, (col. 4, table in lines 33-46);

injecting liquid TEOS into the CVD reactor at a flow rate of 400-1000 sccm, which overlaps 975 sccm (col. 4, table in lines 33-46); and

decomposing the TEOS to form  $\text{SiO}_2$  and depositing the  $\text{SiO}_2$  onto the substrate, the decomposing being conducted at a pressure of from about 5 to 15 Torr, which overlaps 10-80 Torr (col. 4, table in lines 33-46).

It is seen to be inherent that the reactor of **Nguyen** is a cold-wall reactor, because the heating of the wafers is via the lamp heater **38** located beneath the wafer **15** (Fig. 2; col. 3, lines 58-66). **Wolf** at pages 166-167 indicates that when the heating comes from within the reaction chamber, that the reactor is called a "cold-wall" reactor, as compared to a "hot-wall" reactor wherein the heating elements are located external to the chamber.

**Nguyen** does not feed gaseous  $\text{H}_2\text{O}_2$  into the CVD reactor.

**Ikeda** also teaches a plasma CVD method of depositing  $\text{SiO}_2$  on a semiconductor substrate in a cold-wall CVD reactor using TEOS, oxygen and  $\text{H}_2\text{O}_2$ . **Ikeda** states that the  $\text{H}_2\text{O}_2$ ,

"The obtained film is comparable in film properties to silicon oxide films deposited by known plasma CVD methods and, when the substrate has steps such as aluminum wiring lines, is **better in step coverage and gap filling capability**. The film exhibits a still better profile when hydrogen peroxide gas or an alternative hydrogen containing gas is added to the reactant gas mixture." (Abstract)

Regarding claim 61, **Ikeda** discloses that the gaseous precursors of  $\text{H}_2\text{O}_2$  **234** and TEOS are independently fed into the CVD reactor (Fig. 11; col. 11, lines 60-62).

Regarding claim 62, **Ikeda** discloses that the precursors of  $\text{H}_2\text{O}_2$  and TEOS are fed into the CVD reactor simultaneously (Fig. 11; col. 11, lines 60-62).

Regarding claim 64, **Ikeda** inherent feeds gaseous  $\text{H}_2\text{O}$  into the CVD reactor at least because the maximum concentration available is 98%  $\text{H}_2\text{O}_2$  and because  $\text{H}_2\text{O}_2$  decomposes into  $\text{H}_2\text{O}$  and O as shown to be inherent in **Ikeda** in the paragraph bridging cols. 11-12.

Regarding claim 66, **Nguyen** (col. 2, lines 16-21) and **Ikeda** (Abstract) each implicitly teach that the substrate has a high aspect ratio and that the SiO<sub>2</sub> is conformally deposited, because the method “provides improved conformality and void-free gap filling” (Nguyen, col. 2, lines 16-21) and is “better in step coverage and gap filling capability” (Ikeda, Abstract). “[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968) See also *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).

As applied to all of the claims above, it would have been obvious for one of ordinary skill in the art, at the time of the invention to add H<sub>2</sub>O<sub>2</sub> to the gas mixture of **Nyugen** in order to gain better profile in step coverage and gap fill over high aspect ratio gaps, as taught by **Ikeda**.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 60-62, 64 and 66 have been considered but are moot in view of the new ground(s) of rejection.

The rejection of Yieh have been withdrawn because Applicant correctly pointed out that Yieh does not qualify as prior art within the meaning of 35 USC 102. Because the PALM data does not make note of the priority data, Examiner was unaware of the effective filing date for the instant application. Examiner apologizes for any inconvenience.

*Conclusion*

This action is made **NON-FINAL** to given Applicant the opportunity to respond to the new grounds of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached from 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Erik Kielin  
Primary Examiner  
June 10, 2005